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DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
U-3422	UC-03D

DESIGNED BY:	SSM
DRAWN BY:	SSM
CHECKED BY:	HMH
APPROVED BY:	MAP
REVISED:	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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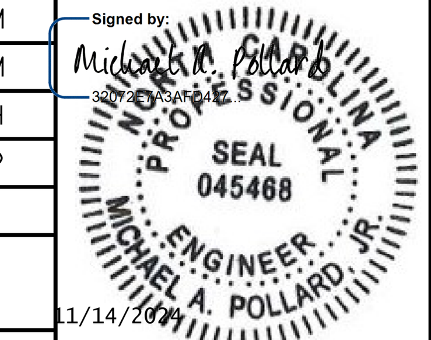


UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

REVISIONS

NOTE:
ANY REFERENCE TO FAYPWC PROJECT COORDINATOR, PWC COORDINATOR OR FAYPWC (FAYETTEVILLE PUBLIC WORKS COMMISSION) SHALL BE INTERPRETTED AS A REFERENCE TO THE ENGINEER.

COMBINATION AIR RELEASE VACUUM VALVE (WATER SERVICE) — W.16

NOTES:

1. COMBINATION AIR RELEASE VALVES SHALL BE OF THE SINGLE HOUSING STYLE THAT COMBINES THE OPERATING FEATURES OF BOTH AN AIR VACUUM AND AIR RELEASE VALVE.
2. THE COMBINATION AIR RELEASE VALVE SHALL HAVE 2" NPT INLET AND 1" NPT OUTLET CONNECTIONS AND A 3/16 INCH DIAMETER ORIFICE (OR ORIFICE SHALL BE DETERMINED BY THE ENGINEER) FOR A MAXIMUM 200PSI WORKING PRESSURE.
3. ALL MATERIALS SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE FAYETTEVILLE PUBLIC WORKS COMMISSION.
4. MANHOLE, FRAME, AND COVER SHALL BE IN ACCORDANCE WITH FAYPWC STANDARD DETAILS. NOTE: LID SHALL INDICATE "WATER".
5. 2" TAPPING SADDLE SHALL BE DUCTILE IRON WITH STAINLESS STEEL STRAPS, BOLTS, NUTS, AND WASHERS.
6. SADDLES FOR PIPE SIZES 8" THRU 24" SHALL BE DOUBLE STRAP.
7. ALL INTERNAL PARTS SHALL BE 316 STAINLESS STEEL.
8. THE COMBINATION AIR RELEASE VALVE SHALL HAVE A SINGLE FLOAT DESIGN.
9. ALL COMBINATION AIR RELEASE VALVES SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.
10. ALL COMBINATION AIR RELEASE VALVES SHALL BE CRISPIN MODEL UX20, ARI D-020, OR APPROVED EQUAL.
11. COMBINATION AIR RELEASE VALVE SHALL BE CENTERED IN MANHOLE. OFFSET THE RING AND COVER TO ALLOW ACCESS.
12. TOP OF WATER MAIN SHALL BE A MINIMUM 4' DEEP AT AIR RELEASE VALVE, UNLESS OTHERWISE REQUIRED DUE TO FORCE MAIN AND/OR COMBINATION AIR RELEASE VALVE SIZE.
13. COMBINATION AIR RELEASE VALVE BODIES SHALL BE MADE OF STAINLESS STEEL OR REINFORCED NYLON
14. THE MANHOLE SHALL BE CAST WITH AN ANTI-MICROBIAL ADDITIVE (CON-SHIELD OR APPROVED EQUAL.)

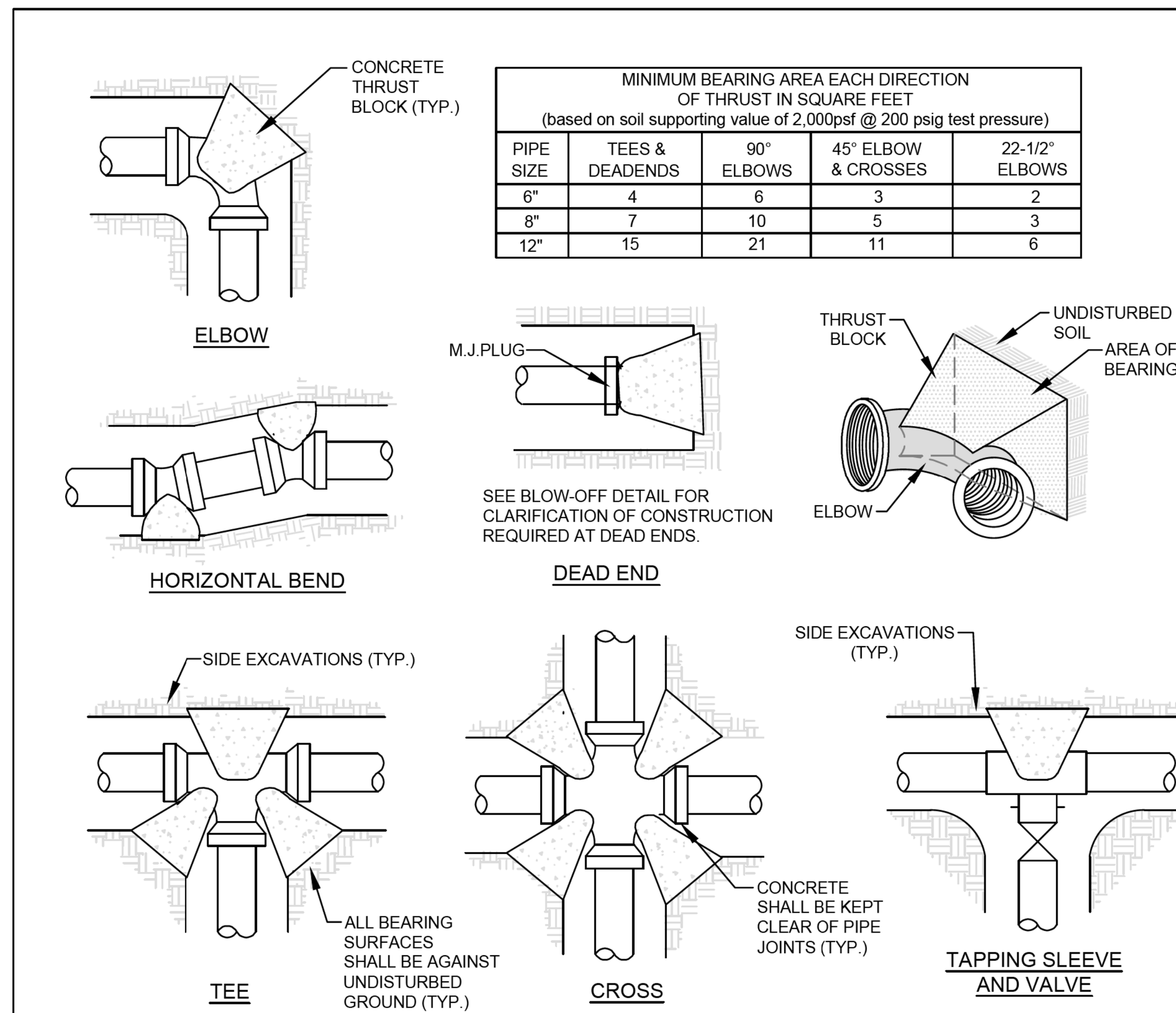
COMBINATION AIR RELEASE VACUUM VALVE (WATER SERVICE)
FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT
SHEET NO. 2 OF 2 | DWG. NO. W.16 | DWG. BY: FAYPWC | DATE: JULY 01, 2024 | APPROVED BY: M.M.M.

NO.	DATE	REVISION
1	01/13	ADDED NOTE 16, REVISED NOTES
2	07/16	DELETED NOTES 3, 16

W16-AIR-RELEASE-VALVE.dwg

CONCRETE THRUST BLOCK DETAIL — W.17

MINIMUM BEARING AREA EACH DIRECTION OF THRUST IN SQUARE FEET (based on soil supporting value of 2,000psf @ 200 psig test pressure)				
PIPE SIZE	TEES & DEADENDS	90° ELBOWS	45° ELBOW & CROSSES	22-1/2° ELBOWS
6"	4	6	3	2
8"	7	10	5	3
12"	15	21	11	6



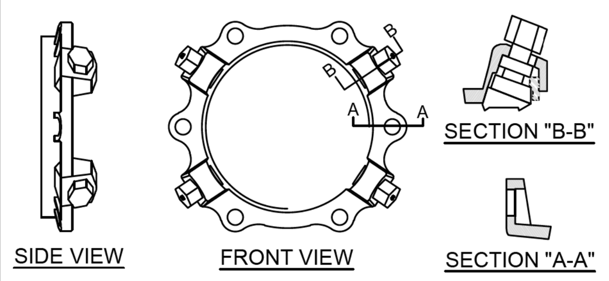
NOTES:
1. THRUST BLOCKS SHALL BE INSTALLED ON PVC WATER DISTRIBUTION LINES 6" THRU 12" DIAMETER IN THE MANNER SHOWN. SEE FAYPWC STANDARD ALTERNATE RESTRAINING DETAIL W.18 FOR ACCEPTABLE ALTERNATE RESTRAINING SYSTEMS.
2. PIPE GREATER THAN 12 INCH DIAMETER SHALL REQUIRE RESTRAINT JOINT PIPE FOR THE PROPER LENGTH.
3. COMPACT FITTINGS ARE NOT ACCEPTABLE. STANDARD FITTINGS SHALL BE USED WITH CONCRETE THRUST BLOCKING.
4. THRUST BLOCKS SHALL BE INSTALLED ON SEWER FORCE MAIN IN THE MANNER SHOWN.
5. IF SAC-CRETE IS USED, MIXING MUST BE ON SITE UTILIZING A MECHANICAL MIXER.
6. NO CONCRETE SHALL BE PLACED ON BOLTS. WRAP JOINT FITTINGS WITH PLASTIC.
7. CONCRETE SHALL BE A MINIMUM 3,000PSI.
8. ALL BEARING SURFACES SHALL BE AGAINST UNDISTURBED SOIL AND SHALL BE APPROVED BY FAYPWC PROJECT COORDINATOR PRIOR TO PLACEMENT OF CONCRETE.
9. USE OF RESTRAINED JOINT DUCTILE IRON WILL BE REQUIRED IF SOIL CONDITIONS DO NOT ALLOW THE USE OF THRUST BLOCKS.
10. ALL VERTICAL BENDS SHALL BE RESTRAINED USING RESTRAINED JOINT DUCTILE IRON PIPE.

CONCRETE THRUST BLOCK DETAIL N.T.S.
FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT
SHEET NO. 1 OF 1 | DWG. NO. W.17 | DWG. BY: FAYPWC | DATE: JULY 01, 2024 | APPROVED BY: M.M.M.

NO.	DATE	REVISION
1	09/05	REVISED TABLE
2	02/07	ADDED NOTES 9 AND 10
3	07/13	ADDED TAPPING SLEEVE AND VALVE DETAIL

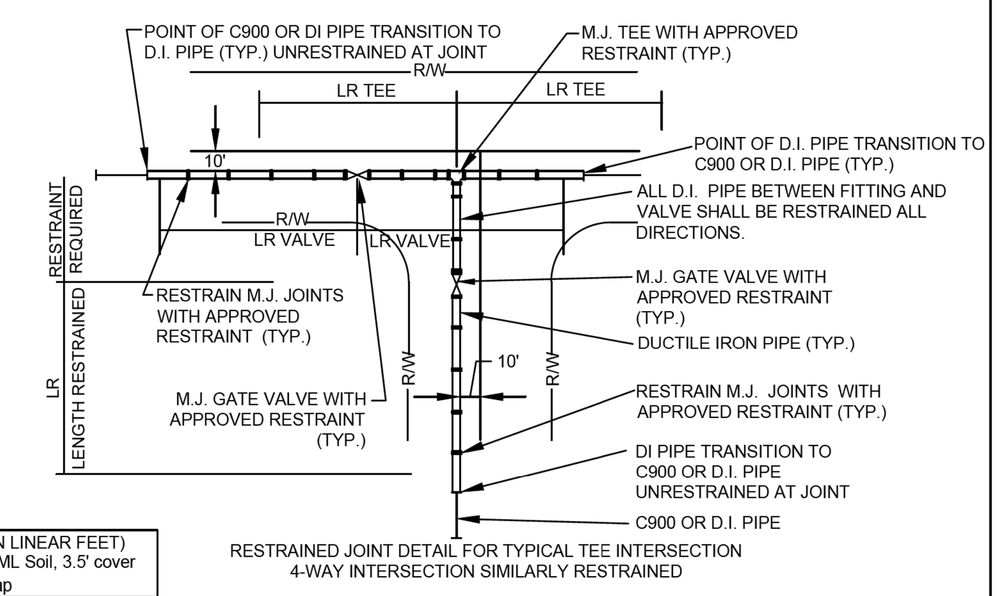
W17-THRUSTBLOCK.dwg

ALTERNATE RESTRAINT DETAIL (DUCTILE IRON PIPE ONLY) — W.18



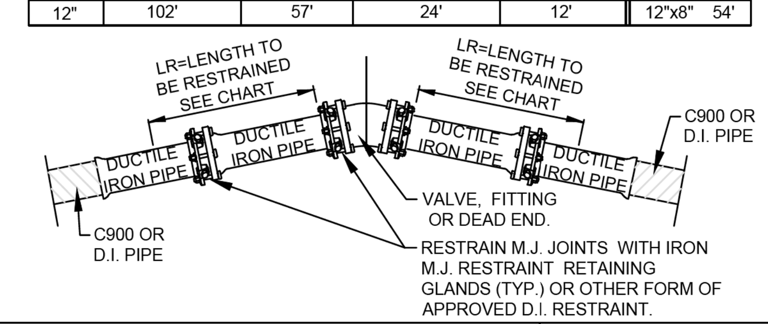
IRON RETAINING GLAND M.J. RESTRAINT			
NOMINAL PIPE SIZE	WEDGES QUANTITY	BOLTS QUANTITY	PRESS RATING
6"	3	6	350
8"	4	6	350
12"	8	8	350

8" SIZE SHOWN 6" AND 12" SIMILAR IRON RETAINING GLAND M.J. RESTRAINT



RESTRAINED JOINT DETAIL FOR TYPICAL TEE INTERSECTION
4-WAY INTERSECTION SIMILARLY RESTRAINED

LR (MIN. LENGTH OF RESTRAINT EACH DIRECTION OF THRUST IN LINEAR FEET) Based on 200 psig pressure, Safety Factor of 2.0:1, BARE DI PIPE AND ML Soil, 3.5' cover. Chart does not apply to pipes wrapped in polyethylene wrap						
PIPE SIZE	VALVES DEAD ENDS TEES	90° ELBOWS	45° ELBOW & CROSSES	22-1/2° ELBOWS	REDUCER	
6"	55'	31'	13'	7'	8"x2"	67'
8"	72'	40'	17'	8'	8"x6"	30'
12"	102'	57'	24'	12'	12"x8"	54'



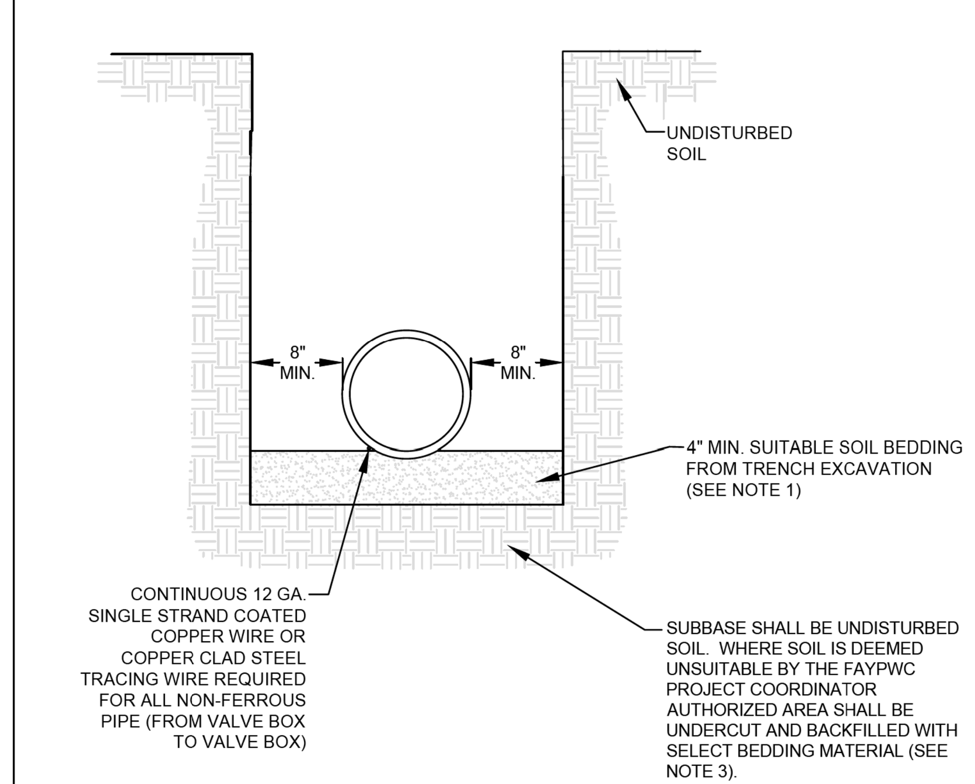
NOTES:
1. THRUST RESTRAINT SHALL BE INSTALLED ON DUCTILE IRON WATER DISTRIBUTION LINES 6" THRU 12" DIAMETER IN THE MANNER SHOWN. SEE FAYPWC STANDARD THRUST BLOCK DETAIL W.17 FOR PVC RESTRAINT.
2. IRON RETAINING GLAND M.J. RESTRAINT OR OTHER FORMS OF IRON RESTRAINT SHALL NOT BE USED ON PVC PIPE.
3. PIPE GREATER THAN 12 INCH DIAMETER SHALL REQUIRE RESTRAINED JOINT PIPE FOR THE PROPER LENGTH.
4. COMPACT FITTINGS ARE ACCEPTABLE FOR USE WITH IRON RETAINING GLAND M.J. RESTRAINT AND OTHER FORMS OF D.I. RESTRAINT.
5. THE MINIMUM LENGTH OF RESTRAINT INDICATED SHALL REQUIRE ALL JOINTS WITHIN THE LR DISTANCE TO BE RESTRAINED.
6. RESTRAINT SYSTEM SHALL BE INSPECTED AND APPROVED BY FAYPWC PRIOR TO BACKFILLING.
7. RESTRAINT SYSTEMS MAY VARY BASED UPON THE ENGINEERS' DESIGN AS SHOWN ON THE PLAN AND PROFILE SHEETS.
8. GRIPPER RING AND FIELD LOK GASKETS ARE AN ACCEPTABLE METHOD OF RESTRAINT ON DUCTILE IRON PIPE ONLY.

ALTERNATE RESTRAINT DETAIL (DUCTILE IRON PIPE ONLY) N.T.S.
FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT
SHEET NO. 1 OF 1 | DWG. NO. W.18 | DWG. BY: FAYPWC | DATE: JULY 01, 2024 | APPROVED BY: M.M.M.

NO.	DATE	REVISION
1	11/16/07	REVISED TABLE, ADDED NOTE 8

W18-RESTRAINT-DETAIL.dwg

WATER MAIN BEDDING DETAIL — W.19



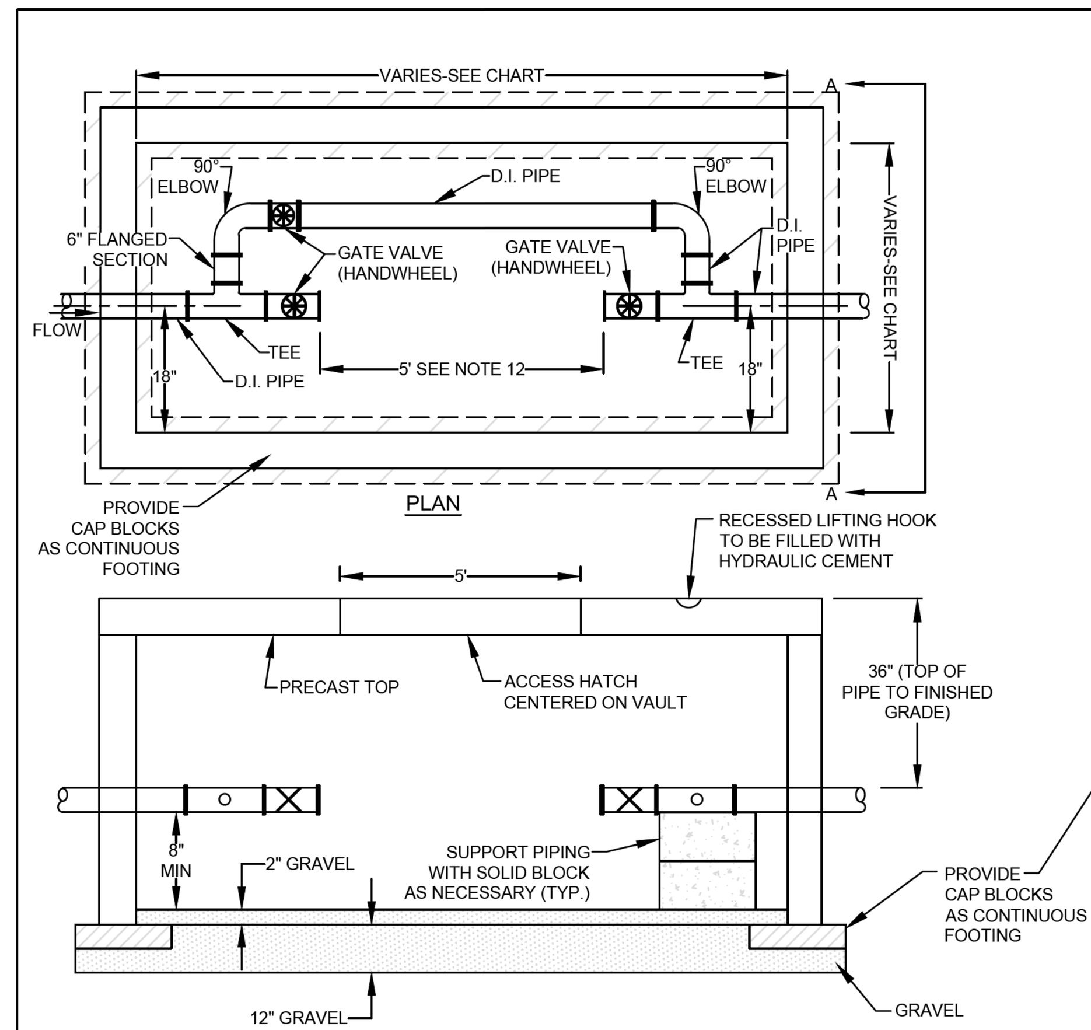
NOTES:
1. SUITABLE SOIL BEDDING IS DEFINED AS "NATIVE" SOIL EXCAVATED FROM THE TRENCH, FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH.
2. SUITABLE BEDDING MATERIAL SHALL EXTEND TO UNDISTURBED TRENCH WALLS.
3. IF GROUND CONDITIONS WARRANT, IT MAY BE NECESSARY TO BED DUCTILE IRON WATER MAINS IN SELECT BEDDING MATERIAL (NO. 5 OR NO. 57 STONE) TO THE SPRINGLINE OF THE PIPE. SUCH INSTALLATION SHALL BE AS DIRECTED BY THE FAYPWC PROJECT COORDINATOR.

WATER MAIN BEDDING DETAIL N.T.S.
FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT
SHEET NO. 1 OF 1 | DWG. NO. W.19 | DWG. BY: FAYPWC | DATE: JULY 01, 2024 | APPROVED BY: M.M.M.

NO.	DATE	REVISION
1	01/01/17	REVISED NOTES
2	07/01/13	REVISED NOTE RE: TRACER WIRE

W19-WATER-BEDDING.dwg

METER VAULT — W.20 (SHEET 1 OF 2)



METER VAULT N.T.S.
FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES DEPARTMENT
SHEET NO. 1 OF 2 | DWG. NO. W.20 | DWG. BY: FAYPWC | DATE: JULY 01, 2024 | APPROVED BY: M.M.M.

NO.	DATE	REVISION
1	09/10	REVISED PIPE BURY DEPTH, NOTES
2	11/23	CLARIFIED FOOTING REQUIREMENTS
3		

W20-METER-VAULT.dwg

METER VAULT — W.20 (SHEET 2 OF 2)

METER SIZE	MIN PIPE DIA	SPACING BETWEEN GATE VALVES (SEE NOTE 20)	VAULT SIZE (INSIDE DIM.)
3"	4"	5'	5'x10'
4"	4"	5'	5'x10'
6"	6"	5'	(SEE NOTE 19) 5'x10'
8"	8"	5'	6'x12'

NOTES:
1. VAULTS SHALL BE PRECAST REINFORCED CONCRETE (4, 000PSI). VAULT CONSTRUCTION SHALL BE CERTIFIED BY MANUFACTURER TO WITHSTAND LOADING DUE TO BACKFILLING, IN ACCORDANCE WITH ACI 318.
2. BRICK VAULTS SHALL NOT BE ACCEPTABLE.
3. NO RISERS SHALL BE ALLOWED.
4. VAULTS SHALL HAVE INSIDE DIMENSIONS AS INDICATED ON CHART.
5. VAULT SHALL BE LOCATED OUTSIDE OF PAVED TRAFFIC AREAS.
6. METER VAULT SHALL BE LOCATED WITHIN PUBLIC RIGHT-OF-WAY OR DEDICATED EASEMENT. IF IN EASEMENT, PROVIDE A MINIMUM 5' CLEARANCE AROUND VAULT.
7. CONTRACTOR SHALL PROVIDE ALL FITTINGS, PIPING, ETC. AS INDICATED.
8. THE VAULT SHALL BE LOCATED NO CLOSER THAN 5' FROM ANY STRUCTURE.
9. PIPING SHALL BE RESTRAINED JOINT DUCTILE IRON FROM TAP AT MAIN TO VAULT.
10. PIPE FITTINGS INSIDE VAULT SHALL BE FLANGED.
11. VAULT SHALL BE SET PLUMB AND LEVEL, MATCH FINISHED GRADE, AND SHALL HAVE POSITIVE DRAINAGE AWAY FROM IT.
12. INSTALL SOLID CONCRETE CAP BLOCKS AS CONTINUOUS FOOTING WITH NO GAPS.
13. FAYPWC TO INSTALL METER AND FITTINGS UPON ACCEPTANCE OF PROJECT.
14. ACCESS HATCH SHALL BE 5'x4' DOUBLE DOOR CENTERED ON VAULT, SO AS TO PROVIDE CLEAR ACCESS TO METER.
15. ACCESS HATCH SHALL BE ALUMINUM, MOUNTED FLUSH AND SHALL BE CAPABLE OF BEARING INCIDENTAL TRAFFIC LOADS. ALL OTHER HATCHES SHALL BE APPROVED BY FAYPWC PRIOR TO CONSTRUCTION. BOLTS, HINGES, AND HOLD OPEN ARM SHALL BE 316 STAINLESS STEEL.
16. ACCESS HATCH SHALL LATCH AUTOMATICALLY UPON CLOSURE (SLAMLOCK). HATCH SHALL BE LOCKABLE USING A KEYED LOCKING MECHANISM INTEGRAL TO THE HATCH. HATCH MANUFACTURER SHALL PROVIDE ONE OPERATING KEY TO FAYPWC.
17. ALL LIFTING HOLES SHALL BE FILLED WITH HYDRAULIC CEMENT.
18. LATERAL AND VAULT INSTALLATION SHALL BE APPROVED BY FAYPWC PROJECT COORDINATOR PRIOR TO BACKFILL.
19. LATERAL AND PIPING INSIDE OF VAULT SHALL PASS HYDROSTATIC AND STERILIZATION TESTS (200PSI).
20. IF USING 8" PIPING WITH A 6" METER, THE VAULT SHALL BE 6'x12'.
21. CONTRACTOR SHALL VERIFY VAULT DIMENSIONS, METER DIMENSIONS, AND PIPE LAYOUT WITH FAYPWC PRIOR TO ORDERING MATERIALS.

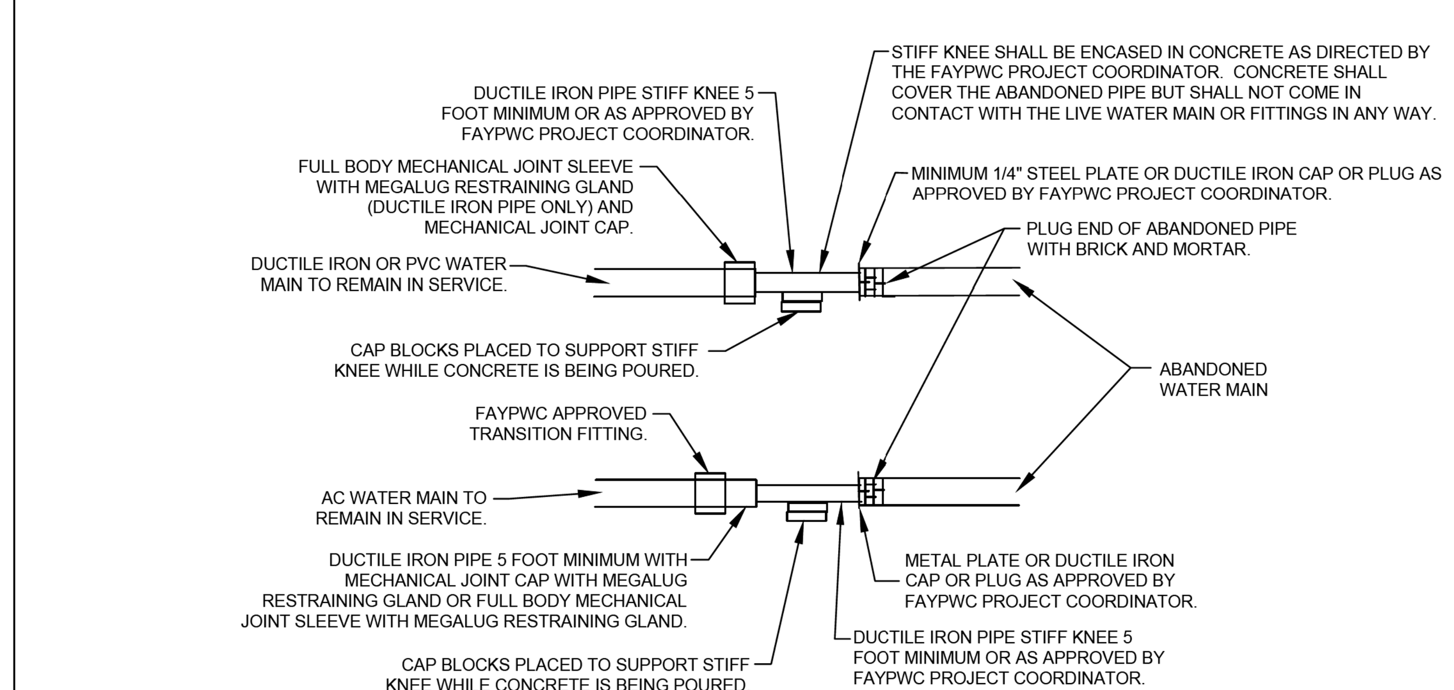
METER VAULT
FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT
SHEET NO. 2 OF 2 | DWG. NO. W.20 | DWG. BY: FAYPWC | DATE: JULY 01, 2024 | APPROVED BY: M.M.M.

NO.	DATE	REVISION
1	09/10	REVISED PIPE BURY DEPTH, NOTES
2	11/23	CLARIFIED FOOTING REQUIREMENTS
3		

W20-METER-VAULT.dwg

WATER MAIN KILL-OUT — W.22

NOTES:
1. KILL OUT SHALL BE DONE A MINIMUM OF 5 FEET FROM ANY FITTING ON THE EXISTING WATER MAIN THAT IS TO REMAIN IN SERVICE.
2. IRON PIPE SHALL BE 4" DIAMETER FOR MAINS 12" OR LESS. UTILIZE 8" PIPE OR LARGER AS DIRECTED BY THE FAYPWC PROJECT COORDINATOR FOR ALL MAINS LARGER THAN 12".
3. ALLOW CONCRETE TO SET-UP PRIOR TO PLACING BACKFILL.
4. VOLUME OF CONCRETE FOR THRUST BLOCK SHALL BE IN ACCORDANCE WITH FAYPWC STANDARD DETAIL W.17.
5. ALL OUTAGES SHALL BE COORDINATED WITH THE FAYPWC PROJECT COORDINATOR.
6. PIPE SHALL BE GROUT FILLED OR REMOVED IN ACCORDANCE WITH NCDOT SPECIFICATIONS WHEN LOCATED IN THE STATE RIGHT-OF-WAY. ALL OTHER INSTANCES SHALL BE IN ACCORDANCE WITH FAYPWC SPECIFICATIONS.

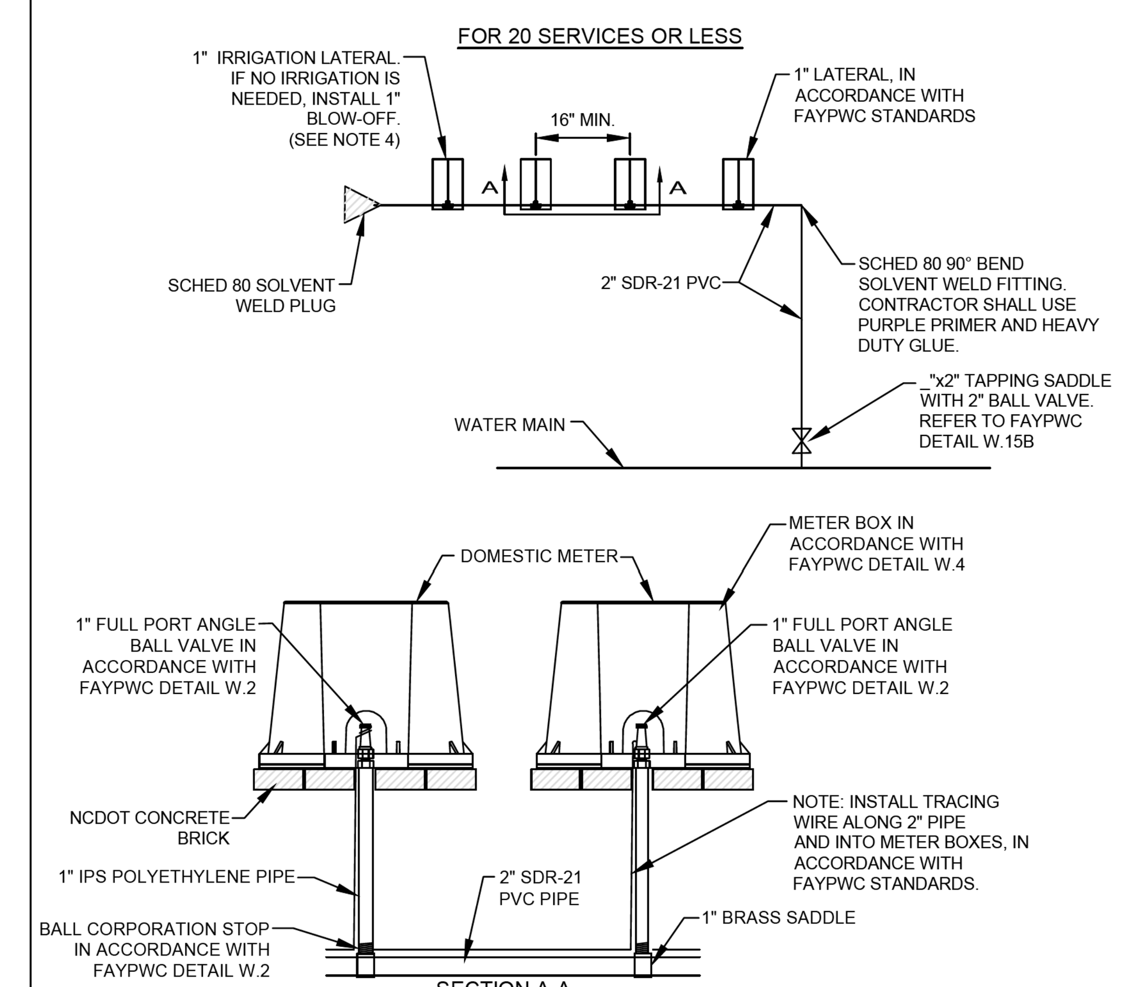


WATER MAIN KILL-OUT N.T.S.
FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT
SHEET NO. 1 OF 1 | DWG. NO. W.22 | DWG. BY: FAYPWC | DATE: JULY 01, 2024 | APPROVED BY: M.M.M.

NO.	DATE	REVISION

W22-WATERMAIN-KILLOUT.dwg

WATER SERVICE DETAILS FOR MULTI-UNIT BUILDINGS — W.23



NOTES:
1. ALL MATERIALS TO BE APPROVED BY FAYPWC.
2. SERVICE LATERAL SIZE 1" IPS POLYETHYLENE UNLESS OTHERWISE SPECIFIED.
3. ALL FITTINGS AND MATERIALS FROM 2" WATER LINE TO AND INTO METER BOX SHALL BE IN ACCORDANCE WITH FAYPWC DETAIL W.2.
4. THE 1" "BLOW-OFF" SHALL BE A STANDARD 1" TAP UP TO AND INCLUDING THE ANGLE BALL VALVE. NO OTHER FITTINGS ARE REQUIRED (IE: SPACER, TAILPIECE). THE METER BOX SHALL BE SET IN ACCORDANCE WITH FAYPWC DETAIL W.2.
5. ALL WATER MAINS AND LATERALS SHALL PASS HYDROSTATIC (200PSI) AND STERILIZATION TESTS.
6. CENTER OF METER BOXES SHALL BE LOCATED A MINIMUM OF 5 FEET FROM THE BUILDING, UNLESS OTHERWISE APPROVED BY FAYPWC.
7. METER BOXES LOCATED IN PAVED AREAS SHALL BE IN ACCORDANCE WITH FAYPWC DETAIL W.4B.
8. LATERALS SHALL NOT BE BACKFILLED UNTIL INSPECTED AND APPROVED BY FAYPWC PROJECT COORDINATOR.
9. SHOULD IT BE NECESSARY TO CRIMP THE WATER SERVICE LATERAL, A FULL CIRCLE REPAIR CLAMP SHALL BE PLACED ON THE CRIMPED AREA.
10. SHOULD THE LENGTH OF THE LINE EXCEED 150 FEET, OR AS APPROVED BY FAYPWC, THE LINE SHALL BE LOOPED.
11. SHOULD THERE BE MORE THAN 20 SERVICES, THE 2" MAIN SHALL BE LOOPED (IE: NO PLUG). IN SUCH INSTANCES, NO 1" BLOW-OFF IS REQUIRED.

WATER SERVICE DETAILS FOR MULTI-UNIT BUILDINGS N.T.S.
FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT
SHEET NO. 1 OF 1 | DWG. NO. W.23 | DWG. BY: FAYPWC | DATE: JULY 01, 2024 | APPROVED BY: M.M.M.

NO.	DATE	REVISION
1	07/16	REVISED TITLE, NOTES
2	07/17	REVISED NOTES

W23-SERVICE-FOR-MULTI-UNIT-BUILDINGS.dwg